PHGenFit: Path length extraction

Previous interface:

```
genfit::MeasuredStateOnPlane* Track::extrapolateToXXX(... , const int tr_point_id = 0)
```

Added a new interface that returns the path length, old interface also still available.

```
double Track::extrapolateToXXX(genfit::MeasuredStateOnPlane& state, ... , const int tr_point_id = 0)
```

The path length is calculated w.r.t. the given measurement (default 0).

Merged into J. Lajoie's repository, would come to the sPHENIX repository with P.R. #201

- https://github.com/johnlajoie/coresoftware/pull/6

Investigate momentum/dca reconstruction Ladder MAPS + TPC

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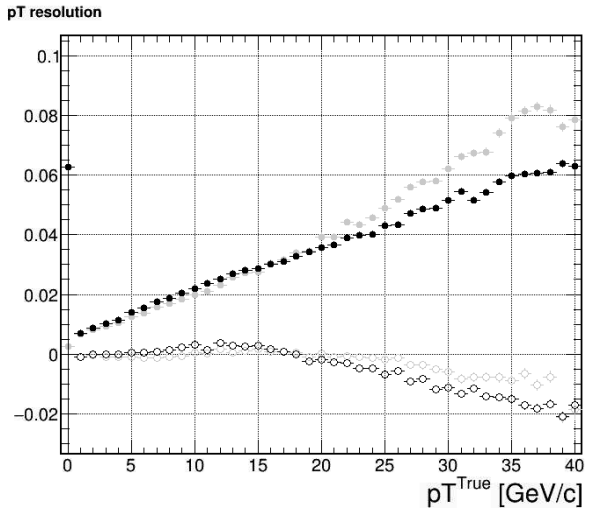
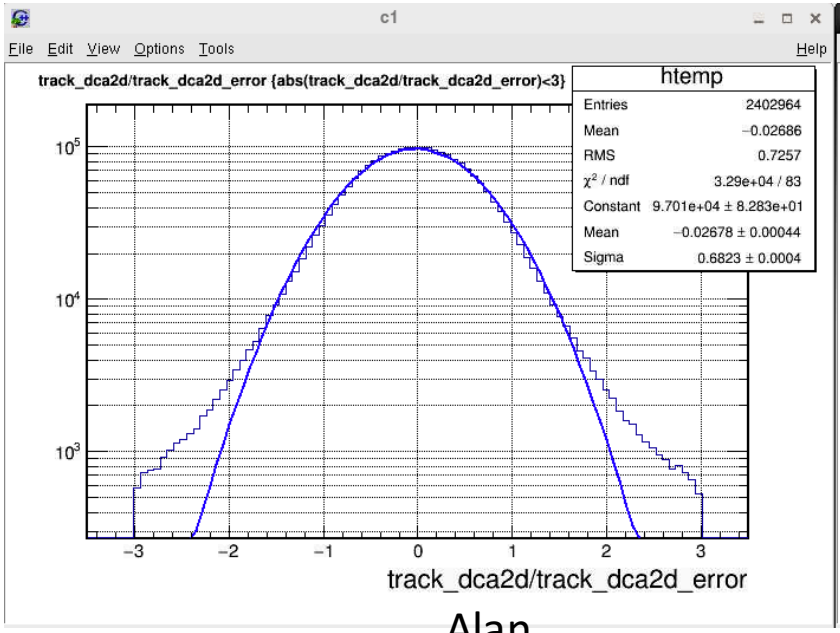
Problems

- ❖ pT offset is off 0
- ❖ dca2d pull σ (σ(dca2d/error)) is off 1.

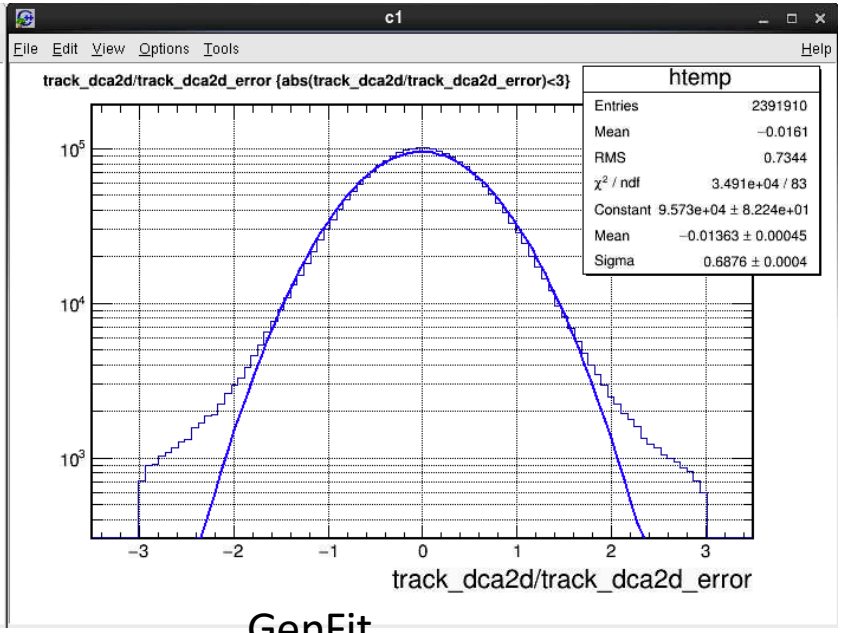
- Possible origins:
  - field map inconsistency
  - clustering (center values, uncertainties)

- I checked the field map settings, and it seems I used consistent field maps:
  - /phenix/upgrades/decadal/fieldmaps/sPHENIX.2d.root
  - Scaled by 1.4/1.5
- We have a FastSim (truth tracking) module "PHG4TrackFastSim" which can do Kalman Fitting based on smeared PHG4Hits.
  - The central value is the PHG4Hit average position of the in and out hits
  - The smearing is given according to detector resolution
  - So there is no clustering involved





Alan

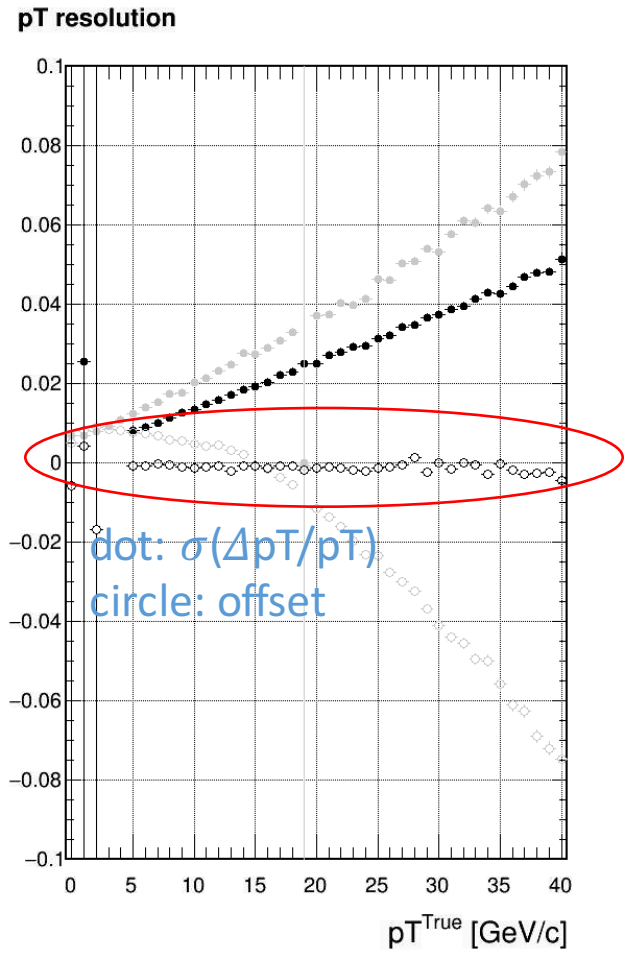


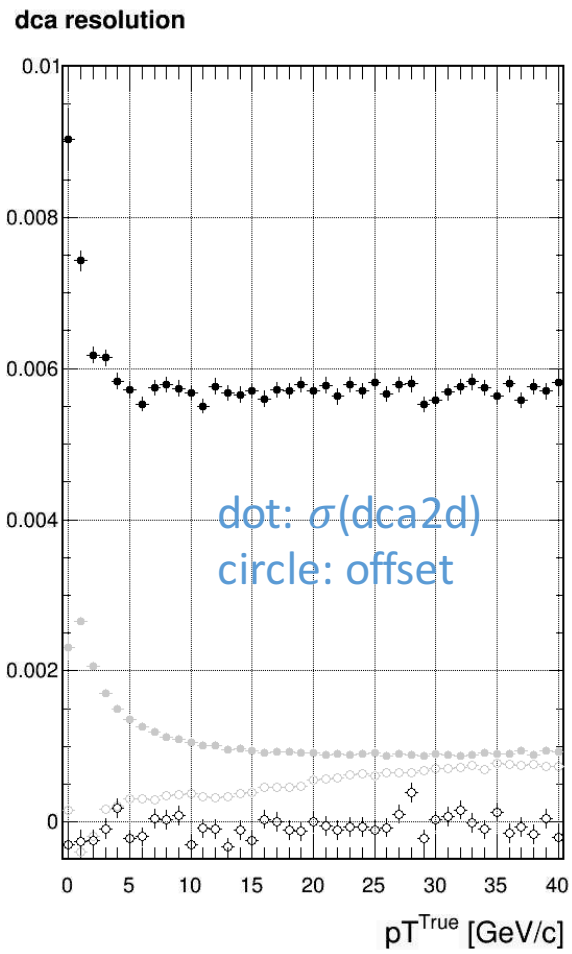
GenFit

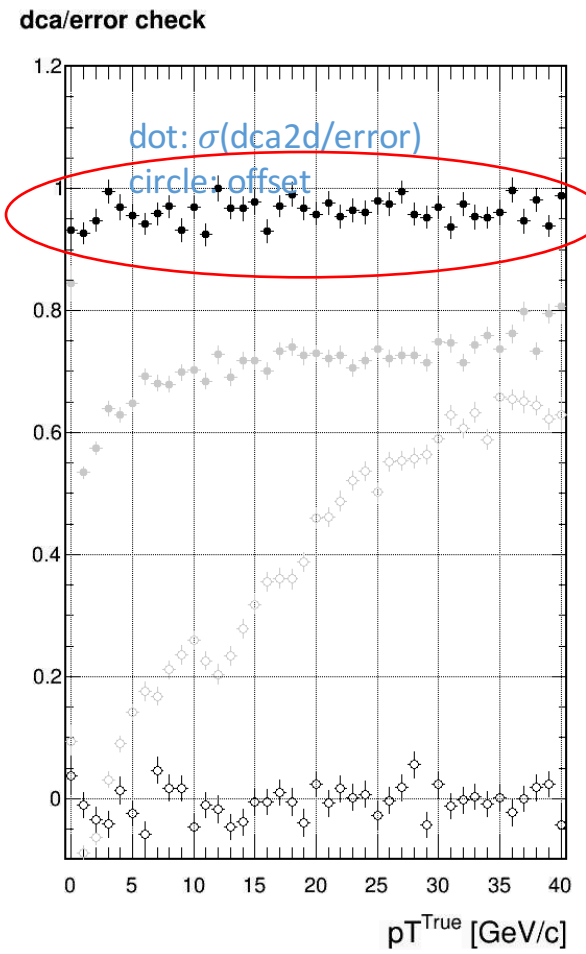
Alan (no PHG4SvtxMomentumRecal, grey) vs. FastSim/Truth Tracking (Black)

FastSim Setup:

- Takes both MAPS and TPC PHG4Hits
- Assign 100 micron resolution to both phi and z resolution
  - All the absolute resolutions don't reflect true detector performance
  - Offsets and pull distributions still make sense
- The reconstructed pT offset is 0.
- The dca2d pull σ is close to 1.







Alan (no PHG4SvtxMomentumRecal, grey) vs. GenFit (with correct norm vectors, Black)

- GenFit refitted results:
  - Better pT resolution at high pT
  - Better dca2d resolution at low pT
  - Dca2d offsets are closer to 0